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AMENDMENT UNDER 37 CFR 1.114  
Patent Application  
Docket No. GJE-7543

March 25, 2009



Louis C. Frank, Patent Attorney

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner : Jade R. Callaway  
Art Unit : 2872  
Applicants : Jeffrey Blyth *et al.*  
Serial No. : 10/565,094  
Conf. No. : 5601  
Filed : January 17, 2007  
For : Holographic Sensor

Mail Stop RCE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA. 22313-1450

AMENDMENT UNDER 37 CFR 1.114

Sir:

A Request for Continued Examination accompanies this Paper.

A one-month Extension of Time is being authorized with the electronic filing of this Paper.

In response to the Office Action dated November 25, 2008, please amend the above-referenced application as follows:

**Amendments to the Specification** begin on page 2 of this paper.

**Remarks/Arguments** follow the amendment sections of this paper.

In the Specification:

Please amend the Abstract as follows:

A holographic sensor is provided. The sensor can include a medium and a hologram disposed throughout the volume of the medium, wherein an optical characteristic of the hologram changes as a result of a variation of a physical property of the medium, and wherein the hologram is formed as a non-planar mirror. An apparatus for detecting an analyte can include the sensor and a unit of optical fibers for transmitting light to and from the hologram.

Remarks

Claims 1-15 were pending in the subject application. By this Amendment, the applicants have amended the Abstract. No new matter has been added by this amendment. Accordingly, claims 1-15 are before the Examiner for further consideration. Favorable consideration of the claims, in view of the remarks set forth herein, is earnestly solicited.

Initially, the Abstract of the disclosure has been objected to for formalities. The applicants thank the Examiner for carefully reviewing the specification. By this Amendment, the Abstract has been amended to remove the phrase “is provided.” Accordingly, reconsideration and withdrawal of this objection is respectfully requested.

Claims 1, 2, 4-6, and 14-15 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Lowe *et al.* (US Patent No. 5,989,923) and Stephens *et al.* (GB 2054995A). The applicants respectfully traverse this ground for rejection because the combination of cited references does not teach or suggest the claimed invention.

The subject invention provides an apparatus for detecting an analyte, comprising a sensor comprising a medium and, disposed therein, a hologram; as well as a method for producing such an apparatus and a method for the detection of an analyte, comprising remotely interrogating with light the holographic element of such a sensor. The applicants would like to emphasize that the hologram of the claimed invention is advantageously formed as a non-planar mirror.

The Action asserts on page 3 that Lowe *et al.* discloses a hologram formed as a non-planar mirror, indicating that a “reflection hologram with fringes that can be flat or curved” meets this element of claim 1. However, the applicants respectfully submit that this interpretation of Lowe *et al.* is incorrect. Submitted herewith is a signed Expert Declaration Under 37 C.F.R. §1.132 of Christopher Robin Lowe. In paragraph 3 of the Declaration, Professor Lowe explains that the Lowe *et al.* reference “does not disclose a hologram formed as a non-planar mirror, or suggest that it should be.” Instead, “a non-planar mirror is a particular embodiment of particular utility in the context of the present invention.” While Lowe *et al.* teach that the fringe planes may be flat or curved, “that is true of almost all holograms.”

Additionally, as indicated in the Lowe Declaration, “the general disclosure of Lowe *et al.* is quite different from the creation of curved fringes as a result of using a reflector with a well defined geometry, which gives rise to controlled geometrical fringes.” Such controlled fringes, as in the claimed invention, “are used to deliberately manipulate the incident light... in a way that conventional curved fringes,” such as those in Lowe *et al.*, do not. This manipulation is advantageous for a sensor used in the apparatus and method of the present invention. Thus, contrary to the Action’s assertion, Lowe *et al.* does not disclose a sensor with a hologram formed as a non-planar mirror, as required by the claimed invention.

Moreover, the applicants respectfully submit that a skilled artisan would not have found a reason to modify the device of Lowe *et al.* with the teachings of Stephens *et al.* The Action states that it “would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Lowe *et al.*, as taught by Stephens *et al.*, in order to guide light with the narrowest possible bandwidth to the holographic surface so that the colors reflected are indicative of the part of the reflector from which it is received.” However, as discussed in paragraphs 4 and 5 of the Lowe Declaration, this statement misinterprets the teachings of Stephens *et al.*.

A skilled artisan would readily recognize that, if “light with the narrowest possible bandwidth” was guided to the surface of a holographic sensor, in most cases there would be no reflection. Accordingly, one of ordinary skill in the art would not consider the disclosure of Stephens *et al.* relevant to use with a holographic sensor of the type described by Lowe *et al.*, and therefore would not have found a reason to combine these references. In fact, the applicants submit that such a reason could only be found with the benefit of hindsight. Hindsight reconstruction of the prior art cannot support a §103 rejection, as was specifically recognized by the CCPA in *In re Sponnoble*, 56CCPA 823, 160 USPQ 237, 243 (1969).

Furthermore, in the subject invention, the unit of optical fibers “guides white light to the surface, captures the reflected narrower band light, and guides that to the detector,” rather than just “using monochromatic light (as disclosed by Stephens *et al.*)” (paragraph 6 of the Lowe Declaration). This key feature of the present invention is not taught or suggested anywhere in the combination of cited references.

As discussed above, neither Lowe *et al.* nor Stephens *et al.* discloses a sensor with a hologram formed as a non-planar mirror, as required by the claimed invention. Also, a skilled artisan would not have found a reason to modify the apparatus of Lowe *et al.* with the teachings of Stephens *et al.*, contrary to the assertion in the Action. In addition, the combination of cited references fails to teach the unit of optical fibers with the advantageous properties of the subject invention. Accordingly, reconsideration and withdrawal of the rejection based on the combination of Lowe *et al.* and Stephens *et al.* is respectfully requested.

Claims 3 and 7-13 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Lowe *et al.* in view of Stephens *et al.* as applied to claims 1 and 5 above, and further in view of Mizutani *et al.* (US Patent No. 6,483,611). The applicants respectfully traverse this ground for rejection because the cited combination of references does not teach or suggest the claimed invention.

The arguments presented above with respect to the rejection based on Lowe *et al* and Stephens *et al.* are hereby incorporated in their entirety. Mizutani *et al.* do not cure or even address the deficiencies of Lowe *et al.* Specifically, there is no teaching anywhere in the combination of cited references of a sensor with a hologram formed as a non-planar mirror. Additionally, Mizutani *et al.* also fail to provide a reason for a skilled artisan to combine the teachings of Stephens *et al.* with Lowe *et al.*.

While the applicants recognize that references cannot be attacked only individually in an obviousness rejection, certain features of the claimed invention are not found anywhere in the combination of cited references. In fact, the applicants respectfully submit that, absent the benefit of hindsight, a skilled artisan would have had no reason to modify the teachings of Lowe *et al.*, Stephens *et al.* and Mizutani *et al.* to arrive at the claimed invention. As discussed above, hindsight reconstruction of the prior art cannot support a §103 rejection. *In re Sponnoble, supra.*

Accordingly, reconsideration and withdrawal of the rejection based on the combination of Lowe *et al.*, Stephens *et al.*, and Mizutani *et al.* is respectfully requested.

In view of the foregoing remarks and the amendment above, the applicants believe that the currently pending claims are in condition for allowance, and such action is respectfully requested.

The Commissioner is hereby authorized to charge any fees under 37 CFR §§1.16 or 1.17 as required by this paper to Deposit Account No. 19-0065.

The applicants also invite the Examiner to call the undersigned if clarification is needed on any of this response, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,



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Attachments: Request for Continued Examination  
Declaration Under 37 C.F.R. §1.132 of Christopher Robin Lowe

Patent Application  
Docket No. GJE-7543  
Serial No. 10/565094

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s) : Jeffrey Blyth *et al.*  
Serial No. : 10/565094  
Filed : January 17, 2007  
Art Unit : 2872  
For : HOLOGRAPHIC SENSOR

Commissioner for Patents  
P O Box 1450  
Alexandria, VA 22313-1450

DECLARATION OF CHRISTOPHER ROBIN LOWE

Sir:

I, Christopher Robin Lowe, of the Institute of Biotechnology, University of Cambridge, Tennis Court Road, Cambridge, CB2 1QT, United Kingdom, make this declaration based on my personal knowledge and belief:

1. I am one of the inventors of the subject Application.
2. I have reviewed the specification and claims, the Office Action dated November 25, 2008, and the references cited in it, including those identified as Lowe *et al* (US5989923) and Stephens *et al* (GB2054995A).
3. The Examiner states that Lowe *et al* discloses apparatus "wherein the hologram is formed as a non-planar mirror (reflection hologram with fringes that can be flat or curved)". That is incorrect. It discloses that the fringe planes may be flat or curved, but that is true of almost all holograms. For example, a hologram of a 3-dimensional object is not flat; the fringes are curved. Accordingly, Lowe *et al* does not disclose a hologram formed as a non-planar mirror, or suggest that it should be; a non-planar mirror is a particular embodiment of particular utility in the context of the present invention. The general disclosure of Lowe *et al* is quite different from the creation of curved fringes as a result of using a reflector with a well defined geometry, which gives rise to controlled geometrical fringes. Specifically, these controlled fringes are used to deliberately manipulate the incident light, such as focus, or control the direction of, the reflected light, in a way that conventional curved fringes from a

three-dimensional object do not. This manipulation is advantageous for a sensor used in the subject Application.

4. The Examiner alleges that it "would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Lowe *et al.*, as taught by Stephens *et al.*, in order to guide light with the narrowest possible band width to the holographic surface so that the colours reflected are indicative of the part of the reflector from which it is received". I believe that this statement misinterprets the disclosure of Stephens *et al.*, in particular.

5. In the event that "light with the narrowest possible band width" was guided to the surface of a holographic sensor, in most cases there would be no reflection. This would be evident to one of ordinary skill in the art, and that person would therefore not consider the disclosure of Stephens *et al.* as relevant to use with a holographic sensor of the type described by Lowe *et al.*

6. It is evident from the specification of the subject Application that, rather than using monochromatic light (as disclosed by Stephens *et al.*), the optical fibres guide white light to the surface, capture the reflected narrower band light, and guide that to the detector. This key feature is not taught by neither Lowe *et al.* nor Stephens *et al.*. Further, neither Lowe *et al.* nor Stephens *et al.* suggests the special utility of the present invention, i.e. the ability to use a subcutaneous implant, in diagnosis.

I hereby further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

By: C.R.Lowe

Date: 16.03.09

PROF. C.R. LOWE